



OZONAIR

LIMITED

Patentees and Manufacturers of
Apparatus for the Commercial Production
 OF
OZONE for All Purposes.



AWARDS

CRYSTAL PALACE 1906

GOLD MEDAL

ROYAL SANITARY INSTITUTE

MEDAL

**FRANCO-BRITISH EXHIBITION
 1908**

GRAND PRIX
 DIPLOME D'HONNEUR
 AND 4 GOLD MEDALS

MULHAUSEN 1909

DIPLOME D'HONNEUR
 AND GOLD MEDAL
 ALSO SPECIAL
 DIPLOME D'HONNEUR
 AND MEDAL
 OF THE CITY OF MULHAUSEN

MOSCOW 1909

GREAT SILVER MEDAL
 OF THE MINISTRY OF
 COMMERCE & INDUSTRY

VIENNA 1910

GOLD MEDAL

TURIN 1911

5 GRAND PRIX
 2 DIPLOMES D'HONNEUR
 2 GOLD MEDALS
 2 SILVER MEDALS

OZONAIR

Apparatus

FOR

General Purposes

No. 1 GENERAL

Offices, Showrooms and Laboratories—

96, Victoria Street, Westminster, LONDON, S.W.

Works—Camden Town, London, N.W.

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Telephone—Victoria 12.

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APPLICATIONS

**Ozonair Systems
 of**

PURIFYING AIR
 VENTILATION
 STERILIZING WATER
 BLEACHING
 THERAPEUTICS
 FOOD PRESERVATION
 BREWING TREATMENT
 CHEMICAL PROCESSES
 LABORATORY OUTFITS
 SUGAR REFINING
 TOBACCO MATURING
 TIMBER SEASONING
 SEWAGE TREATMENT
 Etc., etc.

"The permanent absence of Ozone from the air can be regarded as a proof that the air is contaminated"

DOUGLAS GALTON

ALL ABOUT OZONE.

So long ago as 1785 Van Marum observed that oxygen gas through which an electric spark had been passed possessed a peculiar smell, and at once tarnished a bright surface of mercury, but it was not until the year 1840 that the attention of chemists was again called to this fact by Schönbein. This celebrated chemist showed that the peculiar strong smelling substance, to which he gave the name of Ozone, was capable of liberating Iodine from Potassium Iodide and of effecting many other oxidizing actions.

For many years much doubt existed respecting the exact chemical nature of this oxidizing principle, for the simple reason that it was found impossible to obtain Ozone except in very small quantities, and that an exact investigation of its composition was rendered still more difficult by its extremely energetic properties. Researches, however, conducted with the greatest care, have shown that Ozone is nothing more than CONCENTRATED OXYGEN; and the steps by which this conclusion has been arrived at constitute an admirable example of the successful solution of an apparently insoluble problem by the accumulation of the results of many independent investigations. To Andrews belongs the credit of having first proved that Ozone, from whatever source it may be derived, is one and the same body, having identical properties and the same constitution, and also that it is not a compound of two or more elements, but oxygen in an altered or endothermic form.

ITS WONDERFUL PROPERTIES—Ozone is present in minute quantities in the atmosphere. Its principal sources are probably the electric discharges during thunderstorms, the silent discharge from thunder clouds, the evaporation of water (and especially of saline water, as in sea foam), and the action of some vegetable products on the air. Ozone is also formed by the action of sunlight in the clouds. Ozone present in the atmosphere plays an important part in keeping the air pure and fresh, and destroying the deleterious organic matter constantly passing into the atmosphere from decomposing flesh, animal exhalations, etc.

As Ozone exists naturally in the atmosphere over the sea, about hill tops and elsewhere, it has been rightly designated "Nature's disinfectant," and presents this extraordinary advantage over all other disinfectants, that while destroying the deleterious matter or organisms in the atmosphere, it imparts to the air, at the same time, certain positive properties, rendering it more healthful and invigorating for respiration.

In the open country, and especially at the seaside, Ozone can always be detected; but in the air of towns it is either absent or it exists in very small quantities, which, however, if present, are most advantageous to health. Organic matter, smoke, sulphur compounds and other impurities with which the air we breathe is always vitiated, destroy Ozone, *i.e.*, are in such disproportionate quantity that they absorb all the Ozone; if there were enough of it in the air, these impurities would be swept away.

Ozone, as already stated, unlike oxygen, is possessed of a very powerful and penetrating odour, and very slight traces of this gas can readily be detected by the sense of smell. It has the power of oxidizing or destroying any offensive germs that the air may contain; indeed, it is the most powerful oxidizing agent known, which is due to the fact that it readily parts with the third atom of oxygen contained in the molecule. The conversion of oxygen into Ozone is expressed chemically by the equation $O_2 + O = O_3$, and it is this third atom, which splits off so easily and enters into the combination with other bodies, that is the basis of its value for the purification of the atmosphere, etc.; in fact, it is the most powerful sterilizing agent known.

PURE AIR—The question of the purity of the air we breathe must always be one of the most engaging and serious problems. Whether the place be the home, the office, the workshop, the vehicle, the place of amusement or even the street, the condition of the atmosphere is equally important. It can scarcely be too emphatically asserted that more than half the ills we suffer from are due to slow poisoning produced by the foul air of the rooms in which we live and breathe. It is a popular belief that the contamination of the air of a place in which a number of persons are congregated, is due to an abnormal amount of Carbonic Acid gas. This is supposed to cause the stuffiness, smell and disagreeable taste usually perceived. Such, however, is far from being the case. Carbonic Acid gas is a tasteless and perfectly inodorous gas. It is also practically harmless except in concentration at least ten times as great as is ever met with in the worst cases of bad atmospheres. The fact is that we are constantly throwing off from the skin and lungs the waste products of the body. These minute particles, on coming into contact with the air, immediately putrefy. This, added to super-saturation, due to the moisture contained in the exhaled breath, is the main cause of foetid atmospheres.

Another factor, although perhaps not so important as the foregoing, is the absence of motion in the air. Unless the air is moving, the layer next to the skin becomes overheated and supersaturated with moisture, thus causing great discomfort. For this reason the refreshing breeze is welcomed in hot weather. A lady uses her fan in a close room for the same purpose. If, therefore, means can be found to remove the animal matter and keep the air in gentle motion, we shall be able to produce an atmosphere as near to Nature as will almost defy detection.

Fortunately we have a simple and ready means at hand. Pure Ozone, if diluted to the strength in which it is used for such purposes as ventilation, etc., has a most agreeable and refreshing odour, similar to that met with at the seaside. The sanitation of rooms by ozonized air (antiseptic ventilation) destroys organic germs, and renders innocuous the exhalations from persons in confined spaces. Ozone instantly neutralizes the unpleasant effect of cooking smells.

Ventilation with Ozone can be carried out either with a current of ozonized air circulating in a continuous manner or by diffusing it through the rooms at intervals. In dwelling-houses it is merely necessary that one or two Ozonair apparatus should be used, the size of the apparatus being regulated by the cubic contents of the rooms. One Ozonair apparatus will, in a few moments, purify the atmosphere of a room. There is a sense of cleanness and coolness derived from this process and a corresponding feeling of freshness and vigour imparted to the occupants. The presence of even a trace of pure Ozone in the air of a room is proof of such air having been completely purified.

The following letter from Dr. Leonard Hill, F.R.S., is of the utmost importance in connection with the above statements:—
"I have submitted your system of ventilation to searching tests during the past twelve months, using your apparatus and studying the concentration of Ozone used in your system. Owing to its powerful deodorizing property, ozonized air, as generated by your apparatus, is of value in places permeated with foul odours, offensive trade smells, or where ventilation by heated air is used, and the air is vitiated by the smell of the heating apparatus used. Ozonized air relieves the depressing effect of such air on the nervous system. I have, at the same time, ascertained that there is nothing harmful to human beings in the use of your system."

OZONAIR APPARATUS is characterized by the fact that it produces absolutely pure ozone, entirely free from any contaminating or harmful impurities, such as nitrous oxide, etc., which at once neutralizes the good effects peculiar to ozone.

This statement is confirmed by a very well-known independent authority, E. G. Clayton, F.I.C., Consulting Chemist and Analyst, who, in the course of a report, states "*that a series of tests, based on one of the most sensitive reactions known, failed to show any trace of nitrogen compounds in the effluent from the machine.*"

Ozone is of no use for ventilating purposes unless it is pure; hence, only those generators should be employed which are capable of producing ozone absolutely unadulterated with any other substance.

Ozonair apparatus is constructed on sound and substantial lines and so may be worked continuously, since it is not liable to get out of order. The necessity for continuous operation is of course an essential feature of any practical apparatus utilized for the purification and disinfection of the air on a large scale.

No chemicals or any other substance are used in connection with the operation of Ozonair Apparatus. All that is necessary is a supply of electricity, which may be at any voltage, and obtained from an Electricity Supply Undertaking, a private plant, or from accumulators.

One of the many advantages of the Ozonair Apparatus is that their construction is so simple that it requires no engineer to start an installation, a few simple instructions being quite sufficient. In addition, the cost of upkeep is practically nil.

Nearly fifty different patterns of generators are manufactured by this Company. Each one is suitable for working under certain particular circumstances, although nearly all the small portable types are available for ordinary use. The variation in pattern in these small types is for the purpose of meeting any special condition or requirement.

The experience of the Company is always at the disposal of their clients or prospective customers.

COST OF OPERATION—It has been found from actual experience that the average cost of producing strongly Ozonized air by Ozonair Apparatus, does not exceed one six-hundredth part of a penny per thousand cubic feet, and for large installations this estimate may be somewhat reduced.

Full particulars and prices of the smaller sizes of standard apparatus are given on pages 9, 10 and 11. For large outputs and particular requirements, special quotations and designs will be prepared.

OZONAIR SYSTEM OF VENTILATION—Whilst purifying the air by small Portable Ozonair Apparatus suffices for Living Rooms or Offices of ordinary size, yet in Large Halls, Churches, Theatres and other places where many persons are crowded together, it is necessary, in addition, to arrange for the mechanical introduction of fresh air. Such an installation should be so arranged that draughts are avoided and the amount of air and the strength of the added Ozone adjusted in accordance with the temperature, the state of the barometer and any other desired conditions. The Ozonair System of Ventilation has been designed to comply with these conditions in a perfect manner.

The System consists briefly in drawing the air supply from as clean and pure a source as possible, and removing the smuts and other solid floating matter by means of one of the special Filtering Screens manufactured by the Company. During this operation practically the whole of the sulphurous acid and other deleterious gases, met with in all large cities, are absorbed.

The cleaned air is then passed into a mixing chamber, where it is purified and partially sterilized by means of Ozone. It is also enriched by the addition of a minute quantity of Pure Ozone, which gives it that beautifully refreshing character which the air at the seaside and on mountain tops is known to possess. From the chamber it is distributed by means of ducts, etc., to the various parts of the building.

The method of treatment imparts an artificial sense of coolness to the atmosphere which is most refreshing in hot weather, although it is interesting to note that in cold weather this is unnoticed. A heating or cooling coil, to be placed in the mixing chamber or other convenient position, may be included in the system, if desired.

The manner of distribution, to which the success of the system is partly due, is scientific and practical. There is no hard and fast rule, but each installation is worked out on its particular requirements, and the number of changes of air are calculated according to the nature of the special circumstances of the case. Draughts are avoided and the amount of air and also the strength of the added Ozone can be adjusted at will, so that the atmosphere in the building can be varied according to the temperature or state of the barometer.

From the above description it might appear that the plant required to work the system would be elaborate and complicated. So far from this being the case, however, it is so simple and easy to manipulate that in many of the installations fixed, the whole control is left in the hands of an inexperienced person. The whole working is automatic, and depends on the manipulation of two or three ordinary electric switches. Having started the motors, etc., they may be left unattended for days, if necessary.

The space taken up is comparatively small, and the expense of upkeep is so trifling as to be almost negligible, a comparatively large building being supplied at a cost of only a few pence per day for power, whilst the amount of wear or depreciation is infinitesimal.

THE PUNKAH SYSTEM of ventilation is a modification of the above described Ozonair system of ventilation. It has been designed for special use in hot and damp climates, such as in India, etc., or for cold climates, such as the north of Russia, etc.

In this system the air of the room or building is circulated over and over again through the apparatus. Each time that it circulates it is dried and cooled or heated as the case requires, and it is also cleaned and purified. In this manner the coolness or heat of the air is conserved and, at the same time, a perfect ventilation of the room or building is obtained. The system is operated in exactly the same manner as the ordinary Ozonair system of Ventilation, and the cost of installation and upkeep is about the same.

OZONAIR IN THERAPEUTICS —As soon as the hygienic value of ozone was demonstrated, great popular attention was directed to the subject, and students of medicine in all parts of the world were enlisted as observers and treated the newly discovered compound as an invaluable therapeutic agent.

The whole therapeutic value of Ozone lies in its great power of oxidation; so great is this power that india-rubber tubing and many similar substances perish when brought under its influence, and the lower forms of life, such as bacteria and saprophytic fungi, are attacked with great rapidity. From this energetic destruction of all bacteria, it is evident that the properties of Ozone are largely of an active and antiseptic character, as well as of an oxygenating or vitalizing nature. Ozone has also sanitary and disinfecting properties in a very strong degree, its action being to oxidize or literally to burn up organic matter, including the offensive and infectious germs.

Ozone has been used by the inhalation method in cases of severe anæmia with highly beneficial results, the red corpuscles becoming more numerous, and the shortness of breath disappearing. In several instances of chronic asthma and difficulty of breathing, the use of Ozonair Apparatus has given instant relief and has proved of permanent benefit, and it is at present being used with considerable success in the treatment of consumption. In cases of malaria, typhoid fever and cholera, the bacillæ are immediately destroyed.

In treating chronic ulcers and open festers, wounds and sores, a stream of Ozone directed on to the wound has a very cleansing and healing effect. The value of Ozone in certain forms of skin diseases has also been proved. For the cure of pyorrhœa of the teeth, ozonized oxygen is recommended. A special apparatus for this purpose has been patented and is now being supplied by the Company. It is also applicable for use in the two previously mentioned instances.

Ozonair Apparatus is particularly useful in sick rooms, as, owing to its power of imparting a freshness to the atmosphere, a room in which a small machine is installed is, at all and particular times, rendered pleasant and agreeable. Its value in the hospital and operating theatre cannot be overrated. In this connection, the Company manufactures special forms of apparatus, particulars of which will be found in the succeeding pages.

Such eminent men as Bunsen, Dewar, P. De Puyt, Faraday, Douglas Galton, Boilott, Drs. Lehan, Frohlich, Tyndall, Daubeny, E. Chappins, Sir Thos. Watson, Bart., Ohlmuller, Fox, Richardson, and others have placed the hallmark of their approval on the value of the use of Ozone as a desirable and valuable assistant to health.

We have received many testimonials from grateful clients who have purchased Ozonair machines for medical purposes, and we shall at all times be pleased to refer intending users to the writers of these, or to eminent medical gentlemen.

INDUSTRIAL APPLICATIONS.

It can readily be understood that with a material at hand having such wonderful properties as Ozone undoubtedly possesses, and being so easily and cheaply produced and applied, applications beyond those already described would be quickly found for it. As a matter of fact, the uses to which Ozone can be applied commercially are so many and varied, that it would be impossible, in a short *resumé*, such as this is intended to be, to give even a detailed list, much less an account of each of the processes. We have, however, selected a few of the more striking of them, with a short description to each, but we would ask our readers to communicate with us, giving particulars, or asking for information they may desire with regard to any of the particular processes mentioned, or others which they may be able to suggest and make practical use of. In many instances the particular subject is fully dealt with in a special treatise, a copy of which will be forwarded on application.

BREWING—The Company has introduced and patented a method of using Ozone in breweries. It has many applications in this industry; one of them is to avoid the liability of the yeast to become weak or to be affected by atmospheric influences during the fermenting process, and also in the subsequent yeast storage, thus giving a uniform and sound article all through the year. The purified air enriched by the addition of free Ozone is passed on to the wort, which has the effect of invigorating the fermentative action and of strengthening and improving the yeast. For cooling and refrigerating, the objects are somewhat similar, *viz.*: to rid the air of all the solid impurities, and afterwards to purify it. This is a most important feature, as during these processes of cooling or refrigerating, the wort is exposed to the air in very thin layers, and it is thus much more susceptible to the action of the harmful micro-organisms and germs than in any other of the processes of brewing. In bottling it is also necessary to use pure air, and in addition, if the top layer which is left in the bottle be strongly ozonized, there will be no liability for the beer to go bad. A series of highly interesting and successful experiments were recently carried out in Germany by an eminent Brewer's Consulting Chemist, the apparatus used being supplied by this Company. The results cannot fail to be of immense value to the Brewing Industry of this Country, and an excellent abridged translation of the report appeared in the *Brewers' Journal*, February 15th, 1911. A copy of the reprint will be supplied on application. The Company has already installed this system in several large breweries, where it has now been working for a considerable time with complete success. Permission to refer interested parties to them will readily be obtained.

CHEMICAL PREPARATIONS AND DISINFECTANTS—A large number of the more expensive chemicals can best be manufactured by the aid of Ozone; among such, the manufacture of Synthetic perfumes may be noted. The production of various forms of disinfecting fluids is also accomplished in a cheap and easy manner with the aid of Ozone. In any process depending for its success on oxidation, Ozone will be found of great value, either as the sole means or as an auxiliary. Many of these instances will at once suggest themselves to the Chemist, but one or two examples will suffice. In Linoleum manufacture, in the thickening of the linseed oil necessary for the purpose of making the "Cement," Ozone will greatly shorten the time of oxidation, and in the final process of seasoning or drying the manufactured linoleum, the addition of Ozone in the drying kilns will lessen the period necessary by a large percentage.

DISINFECTION AND DEODORIZING—One of the most noticeable and valuable properties of Ozone is its power of entirely destroying foul odours. This does not imply the substitution of one smell for another, but the actual destruction and removal of the offending odour. There are many cases in which industrial operations cannot be carried on without the accompaniment of very noxious and offensive fumes and smells, and Ozone offers a cheap, simple and ready means of getting over a difficulty which often results in costly actions at law and much unpleasantness of a similar nature. These remarks apply equally well to the waste waters resulting from many industrial operations, which, if not dealt with in some way, will cause pollution and other serious trouble. Ozone offers a simple and sure means of sterilization. Disinfection is only a further step in the same direction and Ozonair apparatus is made in many special forms for this purpose. The subject of Sewer Ventilation is still another branch of this subject. This Company has recently made investigations, and designed a system which is at once effective and moderate in capital cost and upkeep. The disinfection of the holds of Ships, Cold Storage Warehouses and similar places is carried out easily and quickly by means of transportable Ozonair Apparatus constructed specially for the purpose.

FABRICS—Bleaching of many fabrics, notably the very delicate ones, can be successfully accomplished by means of Ozone. In bleaching by this process the fabric is not damaged in any way, as it is liable to be by the chemical treatment at present in use. The operation is also much shorter, but it will, of course, vary with the particular material to be dealt with.

FISH CULTURE, Etc.—The use of Ozone in this direction is two-fold, firstly in breeding and secondly in transport. In the former application, the ozonized air is used for freshening and purifying the water in which the fish are kept and in the latter it is a valuable aid in keeping the fish alive when sending them long distances. Special apparatus has been designed, which can be fitted to Railway Trucks, etc., for this purpose.

FLOUR, Etc.—All these substances are improved in quality and condition by Ozone treatment. In this direction the Company has made very lengthy experiments, and has succeeded in designing a patented form of machine capable of dealing with from ten to twenty sacks per hour. This machine is self-contained, and need only be put together in the flour mill. It forms part of the continuous process of manufacture, the flour passing through it finally before sacking. The cost of treatment is less than one penny per twenty sacks, and the price of the machine is very moderate, taking into consideration its efficiency, the improvement in the colour and quality of the flour, and the low cost of treatment. Attention is particularly directed to the fact that treatment by Ozone is totally different from any of the so-called "Bleaching Processes." Nothing injurious can possibly result to the flour from treatment by Ozone.

FOOD PRESERVATION—Foods of all description, whether animal, vegetable or fish, are kept fresh for varying lengths of time by the aid of Ozone. The advantages of preserving articles for human consumption without the necessity for the use of chemicals more or less deleterious in their effects, cannot be over-estimated. Milk, Butter, etc., may be kept fresh for a long period if an Ozone machine is installed either in the dairy or other place where the milk is kept. The fact that Ozone entirely destroys the various disease germs should not be lost sight of in its application to liquid foods. Meat of all kinds may be preserved for long periods if the application of Ozone is aided by the use of cold, but it is not necessary to freeze the meat, only to chill it. In all places where the canning, handling or manufacture of any food products is carried on, such as butchers' shops, jam, preserve, etc., factories, the use of Ozone must be a very essential adjunct to the machinery of the particular trade. The system has now been in use for some time in a number of important establishments and gives great satisfaction.

LABORATORY AND RESEARCH WORK—Many clients have expressed a desire to carry out investigations with Ozone. A 12-page pamphlet dealing specially with this matter has, therefore, been compiled. It contains much information on the subject, together with a number of illustrations of special apparatus designed for the purpose, with explanatory diagrams showing the method of using them.

Special attention is drawn to the Company's completely equipped Electrical and Chemical Laboratories, with the entire staff of highly trained technical officers always at the disposal of clients, who, for a small fee, can have samples of their materials treated and reported upon. These fees are credited against the purchase price of any apparatus bought from the Company. Anyone desiring information in connection with the application of Ozone in any direction is invited to communicate with the Company, who will do its utmost to meet the wants of clients.

LAUNDRIES—The value of an Ozone installation in a laundry cannot be over-estimated. It may be arranged in such a manner that the soiled linen, etc., on being brought in, would be passed through a special room and thoroughly disinfected, the surplus Ozone being then distributed throughout the remaining portion of the laundry building. The addition of Ozone to the air used in the Drying Chambers gives a freshness of smell to the clothes, peculiar only to that of linen which has been dried in the open country air.

LEATHER—In certain of the processes necessary to the manufacture of leather, Ozone is a valuable adjunct, and by its aid some of the drying and curing portions of the manufacture are considerably curtailed. By this means smaller premises may be used, or the capacity of existing ones may be considerably enlarged.

OILS, FATS AND WAXES—All these substances are bleached and purified by treatment with Ozone. The improvement will vary with the kind of oil or fat. In the case of good quality Palm Oils, the whole of the colour is removed; in other qualities the improvement will be proportional. With bad smelling and dark animal fats, the odour entirely disappears and the colour is much improved. The cost of treatment is only the cost of the electric power for producing the Ozone and in large works this may be a negligible quantity.

PLANT LIFE, Etc.—The beneficial effect of Ozone on Plant Life in general has long been known, and it is a matter for regret that it has been put to so little practical use. Not only is the plant itself materially benefited in its growth and strength, but parasitic growth and the ravages of inimical pest life are prevented. An Ozonair apparatus in a Greenhouse or Conservatory should be installed and its wonderful effect on the vegetation noted.

PRINTED MATTER (Drying of).—In the printing of certain kinds of paper, etc., great difficulty is often experienced in the drying of the ink. In these cases Ozone will be found to aid the process very much, whilst the Ozone will prove very efficacious in purifying the foul smelling air usually associated with this business.

SEWAGE AND OTHER EFFLUENTS—The water from sewage treatment and other industrial operations can be treated in such a manner by the Ozonair System as to render it perfectly fit to pass into rivers, etc. Local and other authorities are now so rigid in their requirements that a simple and perfect method such as the Ozonair System of Water Purification offers, merits very careful consideration.

SUGAR AND MOLASSES are very easily and quickly bleached and clarified. In the case of some samples of West Indian cane-sugar and molasses which were experimented on in the Company's Laboratory, 75 per cent. of the colour was destroyed in a short time. The cost of treatment by this means is only a matter of shillings per ton.

TEA MANUFACTURE—In the manufacture of tea there are certain processes during which the state of the atmosphere plays a very important part. The use of Ozone will prevent much of the trouble occurring during the fermentation and rolling operations. Further information will be supplied on application.

TIMBER of all kinds is more quickly dried and seasoned by the aid of Ozone. Where the process consists in driving heated air through the drying shed, the ozonizing of the air greatly facilitates the operation, in addition to giving a much better result.

TOBACCO in every form is conditioned and matured in a very short time by the employment of Ozone, and the use of it in the factory prevents the formation of moulds.

WATER PURIFICATION—The purity of the water supply is a matter which appeals to every one. The fact that water treated by Ozone is completely purified of all the harmful disease germs, should be sufficient to make it almost a necessity that the system be adopted by Water Companies, Corporations, etc. Ozone is the ideal agent for water purification. It accomplishes its purpose without in any way altering the natural constitution of the water and at the same time leaves no trace of its presence. Water, which previously was alive with dangerous organisms, will, after proper subjection to Ozone treatment, be in perfect condition for consumption. Moreover, its appearance and odour will have been improved and it will have a sparkling brightness which was absent before the treatment. The system has been in use for some time in many large towns on the Continent, and has proved to have been a practical and commercial success. The apparatus required is, of course, special, and depends very much on the quantity of water to be treated per hour, and the local conditions, etc. Although such a short time has elapsed since the Ozonair System was patented and perfected, orders for three most important installations have been placed with the Company. In one case, most stringent conditions were laid down. The guarantees called for were most complete; yet these were all satisfactorily provided by this Company, so reliable and certain in action is the Ozonair Apparatus. Illustrated descriptions with details of these plants will be published in due course.

WATER OF PUBLIC BATHS (Purification of).—This is but a step in the same direction as above. This Company has a system at once simple and inexpensive to operate, by means of which the water in Public Swimming Baths can be continuously purified. All the objectionable matter is removed, the water of the bath kept in a constant state of purity and brightness; free from smell, taste, and perfectly clear.

WINES AND SPIRITS are matured by a very simple process, and a few minutes' treatment will effect the desired alteration equal to years of natural ageing.

OZONAIR APPARATUS AND SYSTEMS are in use throughout the civilised world. In most countries Agencies of the Company are established with stocks of the ordinary types of machines ready for delivery. We append representative list of some of the principal users of Ozonair Systems and Apparatus. The list comprises not only the use of Ozone for Ventilation and Air Purification, but also many of its Industrial Applications.

H.H. Princess von Hohenlohe
His Grace the Duke of Manchester
Her Grace the Duchess of Manchester
The Rt. Hon. the Earl of Crawford,
K.T.

The Rt. Hon. Lord Alverstone,
G.C.M.G., P.C.
The Rt. Hon. Lord Savile, K.C.V.O.
Sydney H. Beard, Esq.
Alastair Currie, Esq.
J. Bristow Jones, Esq., Khartoum
Dockyard, Egypt
H. W. Nelson, Esq.
F. S. Newall, Esq.
Adam Singer, Esq.
Colonel Templar, R.E.
E. J. Thomson, Esq.,

E. Bazalgette, Esq.
Bradshaw & Gass
Sir Wm. Crookes, O.M.
Dr. Neville Davis
Dr. Delepine
Professor J. Haldane
Dr. A. Heinemann
Ottorino Borghi, Novara
General Bossi, Rome
John Murray, Esq., F.R.I.B.A.
Dr. L. J. Phelan
Fred. Simpson, Esq.
Dr. Leon Williams
Dr. C. L. Neustadt
Dr. Amuchastegui
Dr. Mitulescu, Bucharest
Dr. Carlo Profili, Brescia

The Crown Agents for the Colonies
The Russian Government
The German Navy
The Argentine Navy
The Japanese Navy

The Union S.S. Co. of New Zealand
The Austrian Lloyd S.S. Co., Trieste
Thos. Wilson, Sons & Co., Ltd.
Cammell, Laird & Co.
J. I. Thornycroft & Co., Ltd.
Alex. Stephens & Sons, Ltd.

The Commercial Bank of Scotland
The Edinburgh Life Assurance Co.
The Scottish Provident Institution
The Edinburgh School of Cookery
The Law Courts (H.M. Office of Works)
The Leith Academy
Lloyd's, E.C.
The Phoenix Assurance Co.
The North British & Mercantile
Insurance Co.
The Union Bank of Scotland
The University Club, Edinburgh

The Wool Exchange, London
The Polytechnic, Regent Street, W.
Banca Commerciale, Italy
Le Figaro (Offices of), Paris
Asow-Donskoj Kommercial Bank,
Moscow
Discount Bank, Moscow
Russian-Chinese Bank, Moscow
Wolkow & Son's Bank, Moscow
Municipal Offices, Moscow
Semstwo Offices, Moscow
The Electric Light Company, Moscow
Russkoje Slowo (Newspaper)

His Majesty's Theatre, London
The Palace Theatre, London
The Palladium, London
The Tivoli Theatre, Dublin

The Central London Railway

The Knutsford Light and Water Co.
Officine Elettriche Moreno, Alba

The City of Birmingham Corporation
The City of Blackburn Corporation
The City of Bradford Corporation
The City of Bristol Corporation
The City of London Corporation
The Leicester Corporation
The City of Manchester Corporation
The Borough of St. Marylebone
The Accrington Corporation
The Bolton Corporation
Casino Municipal, Trouville
Casino Municipal, Evian-les-Bains

Normal School of Physical Culture

The Batley Cottage Hospital
The Glasgow Cancer Hospital
The London Hospital
Dr. Grinewsky's Hospital, Moscow
Dr. Moikow's Private Hospital, Moscow
The Augusta Hospital, Cologne
Institute Pasteur de Lisboa, Lisbon
Institute Pasteur, Paris
Lutheran Hospital, Moscow
Hospital Diaconat, Mulhausen, Elsass
Associazione Genovese Contro la
Tubercolosi, Genoa

Armstrong College, Newcastle-on-Tyne
Repton School
The Moscow University
The University of California
The English High School, Worcester,
Mass, U.S.A.
County Agricultural Laboratory,
Exeter

The Savoy Hotel, London
The Piccadilly Hotel, London
Ritz Hôtel, Paris
Cabins Restaurants, Ltd., London
The Central Hotel, Cardiff
Cranston's Hotels, Ltd., London
Cranston's Tea Rooms, Ltd., Glasgow
J.P. Restaurants, Ltd., London
Café Palant, Cologne
Hôtel Meurice, Paris
Grand Hôtel des Avants
Central Hôtel, Zurich
Société Immobilière, Lausanne
Hôtel des Sports, Les Avants
Hotel Waldstaedterhof, Lucerne
Hotel Dietsch, Rheinfelden
S. Bisot, Lausanne
Cinema Restaurant, Oxford Street, W.

The Bristol Distillery Co., Ltd.
Fremlin Bros., Maidstone
Hammerton's Stockwell Brewery, S.W.
Mann, Crossman & Paulin, Ltd.,
Whitechapel Rd., E.
J. J. Murphy & Co., Brewers, Cork
North St. Brewery, Brighton
Brasserie de l'Espérance, Schiltigheim
Weihenstephan School of Brewing
Brauerei Boch, Lutterbach, Elsass
Tooth's Brewery, Sydney, N.S.W.
Brasserie de Charmes, France
Brasserie Phenix, Marseilles
Brasserie de la Ville de Paris, Puteaux
Brasserie à Noël, Gerbéviller
Versuchs Lehranstalt für Brauerei,
Berlin
Clinique de la Chaux, Château d'Oex
Dr. Heim, Paris

Grant & May, Billingsgate, E.C.
Linde British Refrigeration Co., Ltd.
Christen Bros., Basle, Switzerland
Erste Ungarische Conservenfabrik,
Budapest
Station d'Essais du Froid, Châteaurenard, France
Marcus Pick, Salami Fabrik in Szeged,
Hungary
Militair Conserven Fabrik Kiralyhida,
nr. Vienna
Abattoirs d'Orleans, Belleville
Sutter (Butcher), Montreux
Walter & Lüthmann, Hamburg
Lugos Abattoir, Hungary
Societa Anonima Cooperativa, Milan

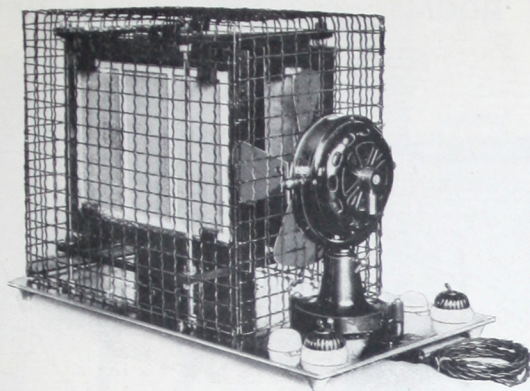
Debenhams, Ltd.
D. H. Evans & Co., Ltd., Oxford St., W.
Chas. Jenner & Co., Edinburgh
Harrod's Stores, Ltd.
Derry & Toms

The British Drug Houses, Ltd.
The British Ever Ready Electrical
Co., Ltd.
J. B. Brooks & Co., Ltd., Birmingham
Brunner, Mond & Co., Northwich
Burroughs, Wellcome & Co., Ltd.
H. W. Caslon & Co., Ltd.
T. Cook & Son, Ltd.
Dewhurst's Engineering Co., Ltd.
Sheffield
Electrical Installations, Ltd.
J. J. Griffin & Sons, Ltd.
The Gutta Percha Co., Ltd.
Harrisons & Crossfield, Ltd., London,
E.C.
Henley's Telegraph Works, Ltd.
Hirschfield Bros., Ltd.
The Hull Oil Manufacturing Co., Ltd.
Ibbotson Bros. & Co., Ltd., Sheffield
Ingenieurbureau Metallwerke Bruno
Schramm, Nürnberg
Societa Anonima Pellicceria, Milan
Zippermayr & Kestnholz, Milan

Wellington & Ward, Elstree
The Imperial Dry Plate Co., Ltd.
Malcolm Inglis & Co. (Hide and Skin
Merchants), Glasgow
Co-operative Wholesale Society, Ltd.
(Hide & Skin Warehouse), Newcastle-on-Tyne
Jonas & Colver, Ltd., Sheffield
Kidston & Co.
F. & G. Osler, Ltd., Birmingham
The Oxford Electric Co.
Parbury, Henty & Co.
The Rangoon Elec. Tramways Co.
The J. D. Riedel Co., Ltd.
Hugh J. Scott & Co., Belfast
Spillers & Bakers, Ltd., Cardiff
The United Flexible Metallic Tubing
Co., Ltd.
Usher & Co.
Westminster Electric Supply Corpn.
Wilkinson, Heywood & Clark, Ltd.
The Colombo Commercial Co., Ceylon
Sig. Francisco Continho, Para, Brazil
Mitsui & Co., Ltd., Japan
The Nuwara Elija Tea Estates Co.,
Ltd., Ceylon
The Selby Smelting & Lead Co.,
California, U.S.A.
A. Steen & Co., Madrid
F. & C. Ziegler, Schaffhausen
E. A. Krauss, Köln, Braunsfeld
Kohl & Bressmer, Bremen

Attention is drawn to the list of Awards gained by this Company in various Exhibitions, International and Scientific. It is unique, inasmuch as the highest Diplomas have always been awarded in every instance.

LARGE PORTABLE SELF-CONTAINED GENERATORS



Types 1 to 4 (STATIONARY).

Suitable for Public Halls, Assembly Rooms, Ships, Factories, Large Offices, Schools, Shops, Laundries, Markets, Hide and Skin Warehouses, Rag Sorters, Wool and Hair Merchants, etc. The various parts of the apparatus are mounted on a substantial base of aluminium, giving the whole a handsome appearance. At the rear end of the machine is mounted a powerful fan. If desired, this fan may be used independently of the Ozone. The Ozone-producing portion of the apparatus is in the front. The various switches, cutouts and plugs used for working the apparatus are fixed on the outside of the base, the functions of each being designated by a neatly engraved tablet. The whole of the machine is constructed of fire-proof material.

PRICES*

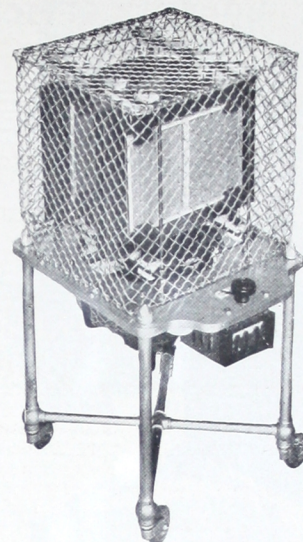
Type No.	For	£	s.	d.
1	For Alternating Current Supply	24	0	0
2	"	32	0	0
3	" Continuous	30	0	0
4	"	39	0	0

The output of the Nos. 1 and 3 Types is about 30,000, and of the Nos. 2 and 4 Types about 60,000 cubic feet of Ozonized Air per hour. Nos. 1 and 3 are suitable for rooms having a capacity up to 6,000 cubic feet, and Nos. 2 and 4 up to 12,000 cubic feet.

Type No. 1	22 × 13½ × 16 Inches	38 lbs.	70 Watts
" 2	28 × 16 × 19	63	125
" 3	23 × 13½ × 16	49	100
" 4	28 × 16 × 19	69	130

When ordering please state Voltage of Electric Supply and whether Continuous or Alternating; if Alternating, the Periodicity (~ per second) must also be given.

* See first paragraph, page 12.



Types 11 to 14 (TRANSPORTABLE).



"ADAMS" CABINET.

This pattern is similar in most particulars to that described opposite. It is, however, designed to work vertically, and is mounted on rubber-tired rollers for the purpose of convenience in transport from place to place. It is therefore specially suitable for use in Hospitals, Infirmarys and such like Institutions, as well as in those instances given for the previous patterns.

PRICES*

Type No.	For	£	s.	d.
11	For Alternating Current Supply	32	0	0
12	"	40	0	0
13	" Continuous	40	0	0
14	"	50	0	0

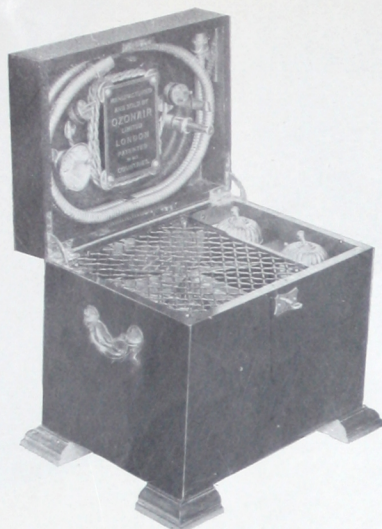
The output of the Nos. 11 and 13 Types is about 30,000, and of the Nos. 12 and 14 Types about 60,000 cubic feet of Ozonized Air per hour. Nos. 11 and 13 are suitable for rooms having a capacity up to 6,000 cubic feet, and Nos. 12 and 14 up to 12,000 cubic feet.

Type No. 11	17 × 17 × 33 Inches	56 lbs.	70 Watts
" 12	22 × 22 × 38	86	125
" 13	17 × 17 × 33	65	100
" 14	22 × 22 × 38	98	130

SPECIAL CABINETS—We also illustrate one of the above pattern apparatus enclosed in a handsomely carved Adams Style Cabinet, which we supplied for use in a mansion. It was designed to match the furniture of the room in which it is placed. The extra cost of the Cabinets is from £15 upwards, according to the amount of workmanship involved in the detail.

SMALL PORTABLE GENERATORS

SUITABLE FOR PRIVATE HOUSES, OFFICES, SICK ROOMS AND SIMILAR PURPOSES



TYPES 21 to 24.

Designed on exactly similar lines to the large apparatus, but on a smaller scale, and comprises an Ozonizing chamber, a fan for distributing the Ozonized air and the electrical portion of the apparatus, with switches, connections, etc.

The whole is fitted in a Handsomely Polished Walnut case, with lock and key and handles for carrying. The various switches and metal parts are all beautifully finished in Nickel Plate or Antique Copper.

All that is necessary is to connect the plug, which is provided, with the source of Electric Supply, and the apparatus is ready to work.

For Medical and Surgical purposes it is fitted with a Flexible Metallic Tube with Mouthpiece and Directing Nozzle.

PRICES*

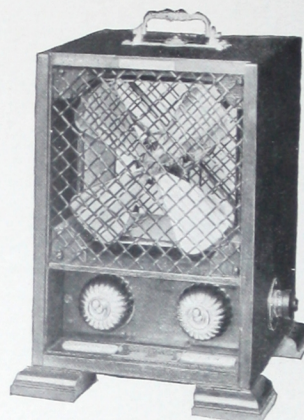
Type No.	For	Alternating Current Supply	with Medical Fittings	£	s.	d.
21	For Alternating Current Supply			10	10	0
22	"	"	with Medical Fittings	12	0	0
23	"	Continuous	"	13	15	0
24	"	"	with Medical Fittings	15	5	0

All the above are suitable for rooms having a capacity up to about 3,000 cub. ft.

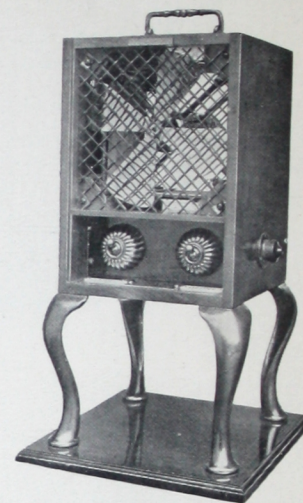
Type No.		Dimensions Inches			Weight Lbs.	Current Watts
		L.	B.	H.		
21		12½	9½	10½	18	20
22		12½	9½	10½	20	20
23		12½	9½	10½	25	25
24		12½	9½	10½	27	25

When ordering please state Voltage of Electric Supply and whether Continuous or Alternating ; if Alternating, the Periodicity (~ per second) must also be given.

* See first paragraph, page 12.



TYPES 31 AND 32.



TYPES 33 AND 34.

These are the Machines described opposite, but made to stand vertically. The fan is mounted horizontally and thus forces the stream of Ozonized Air outward instead of upward as in the aforementioned types.

The method of manipulation is exactly the same and the case and fittings are of similar high-class finish. The case is provided with sliding doors back and front, with locks and keys instead of the hinged lid. The metal parts are all beautifully finished in Antique Copper.

Types 33 and 34 are similar to 31 and 32, but mounted on four Gabriole legs and a polished wood stand. These vertical pattern machines are in use very largely, owing to the simple method of working and their suitability for use in nearly every circumstance.

PRICES*

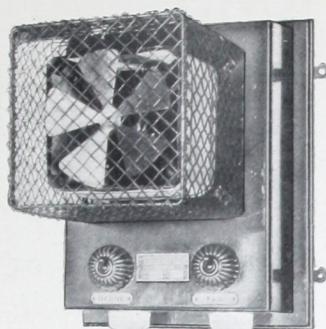
Type No.	For	Alternating Current Supply	Continuous	£	s.	d.
31	For Alternating Current Supply			9	15	0
32	"	Continuous	"	13	0	0
33	"	Alternating	"	10	15	0
34	"	Continuous	"	14	0	0

All the above are suitable for rooms having a capacity up to about 3,000 cub. ft.

Type No.		Dimensions Inches			Weight Lbs.	Current Watts
		L.	B.	H.		
31		9½	9½	13	18	20
32		9½	9½	13	25	25
33		10½	10½	20	23	20
34		10½	10½	20	30	25

SMALL GENERATORS.

FIXED PATTERN



Types 56 to 58.



Types 56 Double to 58 Double.

These are the machines described on the previous page, but made to be fixed on to a wall, ceiling, etc. In addition to their use in ordinary rooms, they are specially suitable for Lavatories, Passages and Small Refrigerating Stores, etc. In some instances, such as in Lavatories, etc., the fan is not necessary and its omission may be an advantage, quite apart from the question of lessened cost.

The Ozone producing part of the apparatus is enclosed in a strong and neat pattern metal guard. The base and guard can be supplied in aluminium.

PRICES *

Type No.	For Alternating Current Supply	£	s.	d.
56	Double	9	0	0
57	Continuous	12	5	0
58	Double	17	5	0
58	Alternating without Fan	6	15	0
58	Double	9	15	0

Nos. 56 to 58 are suitable for rooms having a capacity up to 3,000 cubic feet, and Nos. 56 to 58 Double, for capacity up to 6,000 cubic feet.

Type No.	11½ × 11½ × 14½ Inches	17½ lbs.	20 Watts
56	24 × 10½ × 10	26	35
57	11½ × 11½ × 14½	24½	25
58	24 × 10½ × 10	33	28
58	11½ × 11½ × 14½	16	10
58	24 × 10½ × 10	23	15

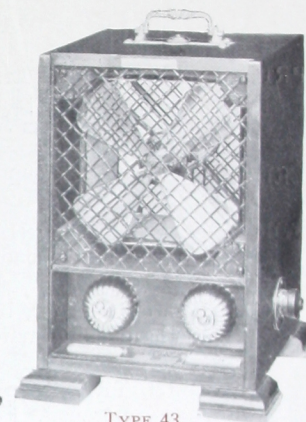
When ordering please state Voltage of Electric Supply and whether Continuous or Alternating ; if Alternating, the Periodicity (~ per second) must also be given.

* See first paragraph, page 12.

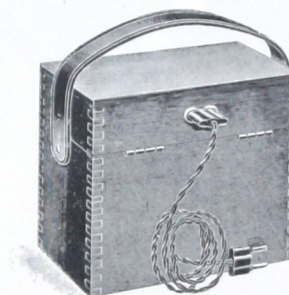
WORKED BY ACCUMULATORS



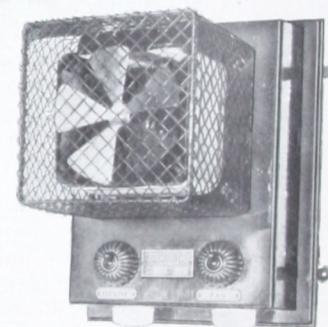
TYPE 41.



TYPE 43.



TYPE 44.



TYPE 45.

These are exactly similar to those previously described, but designed to work off a small accumulator and are thus suitable for service in cases where no Public Supply of Electricity is available.

They are made in Horizontal, Vertical and Wall Patterns, and the first named can be supplied with Medical Fittings. The method of manipulation, etc., is as before described.

PRICES *

Type No.	Horizontal pattern	£	s.	d.
42	with Medical Fittings	11	10	0
43	Vertical	13	0	0
45	Wall	10	15	0
44	Accumulator in Polished Case with Leather Strap	3	18	0
	Recharging accumulators (each)	0	1	0

All the above are suitable for rooms having a capacity up to about 3,000 cu. ft.

Type No.	12½ × 9½ × 10½ Inches	10½ lbs.
41	12½ × 9½ × 10½	15
42	9 × 7½ × 12	14½
43	9 × 5½ × 8½	18
45	11½ × 11½ × 14½	13

TERMS AND CONDITIONS

PRICES in this list are nett, are for cash, and are subject to alteration without notice. Apparatus is stocked for ordinary standard Voltages, which are 100—120 and 200—250 volts. The Standard periodicities for Alternating Current are 40 to 100 ~ per second. Variations from these standards involve an extra charge of 10 %.

LEDGER ACCOUNTS will be opened on the usual references being furnished.

FOREIGN AND COLONIAL ORDERS should be given through an established Shipping Firm in England, or arrangement made for payment in London on presentation of Shipping Documents.

PACKING is charged for, but cases will be allowed for in full if returned within a reasonable time and carriage paid in good condition, with the packing material intact. Delivery in London free, or to carriers' vans, carriage forward.

DAMAGE IN TRANSIT. Goods are packed with the utmost care, and the Company does not hold itself responsible for loss or damage in transit. Should such occur, claim should be at once made on the carriers. It is always advisable to sign for goods "Not Examined."

GUARANTEE is hereby given for all apparatus supplied by the Company, who will repair or replace any article which develops a fault due to defective material or workmanship, if such article be returned carriage paid within six months of purchase.

ILLUSTRATIONS, Dimensions and Weights are not to be considered as binding. Improvements in detail are constantly being made, and the latest type of instrument will be supplied.

THE COMPANY'S completely equipped ELECTRICAL AND CHEMICAL LABORATORY, together with the services of the entire staff of highly trained technical officers, are always at the disposal of clients; and anyone desiring information in connection with the application of Ozone in any direction is invited to communicate with the Company, who will do its utmost to meet the wants of clients.

WARNING. Owing to the success of the Company's manufactures, numerous persons have attempted to copy the design and principle of their apparatus, each of which is covered by numerous Letters Patent. Notice is hereby given that all persons so offending, whether they be makers or only users of such infringing apparatus, will be held liable to the Company for damages, and this Company takes the present opportunity of warning the public against purchasing any apparatus which appears to be like that described in this Catalogue without first ascertaining that such articles are free of infringement of this Company's Patents.

All previous lists are hereby cancelled

Literature relating to other applications of Ozonair Apparatus can be obtained as follows:—

Apparatus for Laboratory and Research Work.
Ozonair Ventilating Systems.
Water Purification.

Bleaching Oils, Fats, Waxes, Etc.
Food Preservation.
Ozonair in Brewing.